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**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Application of Pacific Gas and Electric Company  
(U 39 M) to Submit Its 2020 Risk Assessment and  
Mitigation Phase Report.

Application 20-06-012  
(Filed June 30, 2020)

**OPENING COMMENTS OF THE UTILITY REFORM NETWORK ON  
PACIFIC GAS AND ELECTRIC COMPANY'S RAMP REPORT AND  
THE SAFETY POLICY DIVISION'S NOVEMBER 25, 2020 EVALUATION REPORT**



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## **I. INTRODUCTION AND SUMMARY OF COMMENTS**

Pursuant to the November 4, 2020 Assigned Commissioner's Scoping Memo and Ruling (Scoping Memo) , The Utility Reform Network (TURN) submits these comments in response to: (1) the Risk Assessment and Mitigation Phase (RAMP) Report of Pacific Gas and Electric Company (PG&E) in advance of its 2023 General Rate Case (GRC); and (2) the Safety Policy Division (SPD) Staff Evaluation Report on PG&E's Report.

On November 1, 2020 TURN served SPD and the parties with extensive Informal Comments on PG&E's RAMP Report and Scenario Results, which for convenience are attached here as Exhibit A. TURN stands by, and reiterates, the analysis and recommendations in those Informal Comments and hereby incorporates those Informal Comments into these formal Comments.

TURN appreciates the resources and diligence that SPD devoted to the preparation of the SPD Report, particularly the all-important Wildfire Risk chapter of PG&E's Report. These Comments focus primarily, but not exclusively, on TURN's reactions to SPD's analysis and recommendations. As a general matter, TURN is impressed with the quality of the analysis in SPD's Report.

As TURN has repeatedly commented, TURN views this RAMP as particularly important because it addresses the first Report to implement the requirements of the settlement adopted in D.18-12-014. Accordingly, TURN has devoted significant resources to review and analysis of the PG&E Report and SPD's evaluation. Nevertheless, because of the extremely broad scope and complexity of the risk analysis in PG&E's Report, TURN has had to prioritize its review and has been unable to carefully review all chapters in PG&E's Report and the corresponding SPD

evaluation. Accordingly, TURN's silence on an aspect of PG&E's or SPD's analysis should not be construed as TURN's agreement with the issue in question.

## **II. ISSUES OF GENERAL APPLICABILITY**

### **A. SPD Appropriately Flags PG&E's Reactive Approach to Risk Management**

SPD rightly points out that PG&E's risk management approach "continues to be reactive to catastrophic events."<sup>1</sup> While PG&E is now appropriately highly focused on the Wildfire risk, PG&E's track record raises concern that, by skewing its analysis to whatever risk caused the most recent catastrophes, PG&E may be missing opportunities to get out ahead of looming risks. For this reason, it is important that the risk methodology adopted in the SMAP Settlement be applied in a way that does not unduly inflate risks that have already been mitigated to a significant extent. Meeting the granularity requirements of the Settlement is one important way to ensure that Risk Spend Efficiency (RSE) scores are appropriately targeted to aspects of PG&E's system that are most in need of risk mitigation efforts. Another important element is ensuring that PG&E has appropriately taken into account, at the tranche level, the risk reduction benefit of work to be performed in 2020-2022 in calculating RSEs for mitigations proposed for the 2023 GRC.

### **B. SPD Correctly Highlights Insufficient Granularity of Tranches as One of the Most Serious Problems With PG&E's RAMP Analysis**

SPD appropriately points out that insufficient granularity of tranches is a major problem with PG&E's analysis.<sup>2</sup> SPD correctly cites the applicable requirements of the SMAP

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<sup>1</sup> SPD Report, p. 5.

<sup>2</sup> SPD Report, pp. 5, 13-14.

Settlement, which PG&E clearly has not satisfied for many risks. In addition to the Wildfire Risk, this is also a significant problem for PG&E's analysis of the Loss of Containment risks for both Gas Transmission and Gas Distribution pipelines.

TURN's Informal Comments devoted significant attention to the Settlement's tranche requirements, the importance of compliance with those requirements to targeted and cost effective risk reduction, and explanations of some of the most serious shortcomings in PG&E's analysis.<sup>3</sup> We will not repeat that discussion here, and instead simply underscore that fixing this problem is one of the most important changes PG&E needs to make to its GRC analysis.

**C. SPD Appropriately Continues to Push PG&E to Include "Controls" in its Analysis**

SPD aptly explains the importance of including existing mitigation efforts – which PG&E calls "controls" – in the RAMP analysis to enable the effectiveness of new and existing mitigations to be compared. As SPD states, failure to calculate RSEs for controls undermine Row 26 of the Settlement Agreement, which requires utilities to provide a ranking of all RAMP mitigations by RSE.<sup>4</sup> TURN further addressed this problem in its Informal Comments and recommended that PG&E be advised that it will be expected to provide RSEs for all mitigation, whether new or existing, in its updated analysis for the GRC.<sup>5</sup>

TURN is pleased with SPD's statement that PG&E has indicated that it will provide RSE calculations for all controls in its upcoming GRC application<sup>6</sup> and expects PG&E to honor this commitment.

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<sup>3</sup> TURN Informal Comments (Ex. A to these Comments), pp. 1-6.

<sup>4</sup> SPD Report, p. 14.

<sup>5</sup> TURN Informal Comments (Ex. A to these Comments), pp. 15-16.

<sup>6</sup> SPD Report, p. 15.

**D. The Best Way to Address Uncertainty in the Estimates Is to Make Clear that PG&E Should Be More Transparent About Its Level of Certainty Regarding Inputs to Its Calculations**

SPD notes that the results of the RAMP analysis are expressed as “point estimates” and expresses concern that such a presentation of results fails to capture the utility’s level of certainty or uncertainty regarding the results. To address this concern, SPD suggests that PG&E provide confidence intervals for its results.<sup>7</sup>

While TURN understands the concern, we do not agree that PG&E or other utilities should be required to calculate variances and confidence intervals for their RSE calculations and other results. To do such calculations properly would be extremely complicated, and it would be challenging to ensure that the calculations were performed correctly.

The issue that SPD identifies is largely an issue of transparency. A presentation of results, by itself, does not indicate how sensitive particular RSEs are to changes in inputs to those calculations. To address this concern, PG&E should provide in its Report more and better information about the uncertainty of the inputs to the RSE calculations and the effect of that uncertainty on a given RSE. Such an approach is consistent with our call for increased transparency, as required by the Settlement,<sup>8</sup> and would enable parties to have more information to know when it would be most appropriate to calculate alternative RSEs with different input values.

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<sup>7</sup> SPD Report, p. 15.

<sup>8</sup> TURN Informal Comments (Ex. A to these Comments), pp. 10-12.

**E. In Its Multi-Attribute Value Function, PG&E Should Use Linear Scaling Functions for Its Safety and Financial Attribute**

TURN's Informal Comments explained why PG&E should replace its non-linear scaling functions for the Safety and Financial attributes with linear scaling functions.<sup>9</sup> TURN provided illustrations to show that use of non-linear functions lead to results that defy common sense.

SPD's Report states that TURN has raised a "legitimate question" and that, in direct economic terms, the results shown by TURN's example, could indeed be viewed as irrational. However, SPD suggests that TURN's example fails to take into account other secondary impacts of catastrophic events, such as negative psychological impacts and disproportional impacts on affected communities.<sup>10</sup>

TURN respectfully suggests that SPD's comment about secondary impacts misses the mark, perhaps because TURN did not explain its example as well as it should have. We could have made more clear that, in the "catastrophic" situation – let's revise the example to posit a reduction from 100 deaths to 99 deaths – the import of reducing the number of deaths by 1 is that a tremendous catastrophe still occurred and was not prevented, one which caused 99 deaths! Yet, the logic of PG&E's non-linear function is that making this catastrophe only slightly less fatal is of equal risk reduction value to avoiding 10 incidents that each cause 1 death. In other words, the mitigation that reduces deaths from 100 to 99 does not prevent the catastrophe, yet according to PG&E's scaling function it is 10 times more valuable than another mitigation that has the same expected effect on the number of effective fatalities (EF), by reducing 1 EF to 0. It

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<sup>9</sup> TURN Informal Comments (Ex. A to these Comments), p. 8.

<sup>10</sup> SPD Report, pp. 15-16.

is not clear why such a mitigation would be viewed favorably when compared to avoidance of 10 deaths in ten separate incidents.

Moreover, under a linear scaling function, an event that causes 10 deaths is 10 times worse than an event that causes one death. In this way, the linear functions recognizes that a catastrophic event is much, much worse than a lesser event.

Accordingly, TURN continues to hold to its position that PG&E's non-linear functions for the Safety and Financial attributes are irrational and should be changed to linear functions.

### **III. WILDFIRE RISK ISSUES**

#### **A. TURN Welcomes SPD's Conclusion that PG&E Needs to Model Operational Failures as a Risk Driver**

TURN's Informal Comments pointed to the strong, and in many cases indisputable, evidence that most of the catastrophic wildfires that PG&E has caused from 2017 to the present would not have occurred but for operational failures by PG&E – primarily in the areas of vegetation management and facility inspections. TURN stated:

Nevertheless, despite this history, PG&E's Wildfire Risk analysis refuses to acknowledge its operational failures as a key driver of catastrophic wildfires. Instead, PG&E wants the Commission to accept its fantasy view of the world in which these operational failures have nothing to do with the wildfires PG&E has caused. By excluding the driver of operational failures, PG&E's risk mitigation analysis ignores what is likely the most important mitigation of all – the Plan A of simply doing its work properly. Spending billions of dollars on vegetation management and facility inspections is not cost-effective if the work is not performed correctly.

When operational failure is included as a driver, PG&E is forced to focus leadership attention on relatively low-cost measures (such as improved Quality Assurance and Quality Control) that would provide a major risk reduction benefit.

By excluding this key driver of risk, PG&E is inviting us to accept the myth that its operational failures are not a source of risk and, thus, do not need attention from its leaders and its regulators -- that expensive mitigation programs should be the only focus. Although significant spending on wildfire mitigation



programs will be necessary, a true and correct portrait of PG&E's Wildfire Risk requires that the considerable risk resulting from PG&E's operational failures be recognized and that the risk reduction benefits from fixing those problems be quantified. Absent inclusion of operational failures as a driver, the risk analysis is incomplete and insufficient, to the detriment of ratepayers who will be required to pay billions for wildfire mitigation programs.<sup>11</sup>

TURN is gratified that SPD concludes that TURN has raised "very valid concerns" and that PG&E should model operational failures as a risk driver for its 2023 GRC.<sup>12</sup> TURN hopes that PG&E's new leadership will recognize that fixing this serious problem is necessary for PG&E's wildfire analysis to be credible and to focus on the most necessary and cost-effective wildfire risk mitigations, including basic and relatively low-cost mitigations such as improved quality assurance and quality control. PG&E needs to make a break from its unfortunate past and rise to the challenge of accepting the reality that focusing on how to prevent operational failures will provide significant risk mitigation. "Sometimes things just break," the infamous excuse that PG&E's prior CEO offered for the Kincade Fire,<sup>13</sup> is a defeatist mindset that PG&E's new leadership must eradicate. It can start by accepting that operational failures have been a key driver of PG&E's catastrophic wildfires and directing that PG&E's RAMP be revised to reflect this reality.

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<sup>11</sup> TURN Informal Comments (Ex. A to these Comments), pp. 6-7.

<sup>12</sup> SPD Report, p. 54.

<sup>13</sup> "Sometimes things just break: PG&E CEO grilled by fire victim," *San Francisco Chronicle*, Feb. 25, 2000: <https://www.sfchronicle.com/business/article/Sometimes-things-just-break-PG-E-CEO-15084426.php>

**B. TURN Supports SPD's Recommendations to Improve the Granularity of Tranches**

The SPD Report appropriately devotes significant attention to the most serious problem in PG&E wildfire risk analysis – insufficient granularity of tranches. SPD correctly explains that it is unlikely that the two non-Hardened HFTD Distribution tranches have homogenous risk profiles for the 6,929 circuit miles (“To Be Hardened”) and 18,310 circuit miles (“Remainder”) within these tranches. SPD similarly finds that it is improbable that the HFTD Transmission Tranche has a homogenous risk profile for its 5,526 transmission circuit miles.<sup>14</sup>

SPD's conclusion that these tranches are not sufficiently homogenous is supported by PG&E's own wildfire risk analyses presented in other proceedings; as PG&E stated in its 2020 Wildfire Mitigation Plan (WMP), “approximately 95% of the wildfire risk is in 22% of the [High Threat Fire District] distribution line miles,”<sup>15</sup> which equates to around 5,500 circuit miles. Based primarily on PG&E's own risk analysis TURN asked PG&E to run (in Data Request 6-1)<sup>16</sup> a scenario analysis after TURN submitted its Informal Comments to more properly reflect both the allocation of wildfire risk in PG&E's service territory and more granular tranches with somewhat homogenous risk profiles to help analyze the cost-effectiveness of various mitigations.

The results for the latest scenario analysis performed by PG&E are shown in the table and chart below.

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<sup>14</sup> SPD Report, p. 50.

<sup>15</sup> PG&E WMP Filing, 2/7/20, p. 5-274.

<sup>16</sup> TURN Data Request 6-1 and PG&E's response are attached to these Comments as Exhibit B.

<b>HFTD Distribution Tranche (TURN Tranches)</b>	<b>RSE Value (TURN MAVF)<sup>17</sup></b>	<b>Tranche Miles</b>	<b>Cumulative Miles</b>
2	N/A	325	325
3	N/A	759	759
4	N/A	397	1,156
5	32.7	395	1,551
6	37.2	355	1,906
7	31.7	392	2,298
8	21.4	625	2,922
9	21.7	616	3,538
10	18.0	396	3,933
11	14.5	463	4,396
12	5.7	1,161	5,557
13	0.3	20,038	25,595

In this table, Tranches 2-12 constitute about 5,500 of the 6,929 miles in PG&E’s “To Be Hardened” tranche, and Tranche 13 constitute the remainder of circuit miles in To Be Hardened and all of the miles in PG&E’s “Remainder” tranche. As shown, there is a drop-off in RSE values after Tranche 7, a steeper decline in RSE from Tranche 11 to Tranche 12, and then an extremely low RSE for Tranche 13. The upshot of this more granular analysis is that System Hardening is most cost effective for a subset of PG&E’s presumptuously-named “To Be Hardened” Tranche. Indeed, it may not make sense to engage in costly System Hardening for a significant portion of that tranche. This analysis demonstrates the significant limitations of PG&E’s broad tranches to arrive at meaningful conclusions about the relative effectiveness of various mitigations, and the importance of the settlement’s requirement to incorporate tranches with homogenous risk profiles.

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<sup>17</sup> No RSE is shown for Tranches 2-4 because PG&E indicates that they will already be hardened before the start of the 2023 GRC period.

SPD's Report also appropriately highlights that one of the benefits of more granular tranches is more accurate baseline risk scores. The Report states: "SPD finds that TURN's requested Tranche Scenario Analysis appears to support that more granular tranches allow PG&E to more accurately reflect the risk reduction benefits of mitigation work that is expected to be completed *before* the next GRC period starts in 2023 resulting in a significantly lower baseline TY2023 wildfire MA Risk Score."<sup>18</sup> This finding reinforces TURN's point in Section II.A of these comments – that increased granularity will enable PG&E to be less reactive to past events and to better understand how well positioned it is to address future risks.

SPD generally recommends that PG&E address the insufficient granularity of its tranches by "divid[ing] its overhead Distribution and Transmission powerlines by some appropriate combination of (1) assets and (2) subsystems of its very large electric system by geographic location relevant to wildfire risks."<sup>19</sup> SPD further recommends that PG&E should aim to have no more than 500 circuit miles in tranches with the highest risk scores per mile.<sup>20</sup>

TURN fully supports SPD's evaluation of the need for and benefits from more granular tranches, particularly for the portions of the system with the highest relative risk scores per circuit mile. TURN urges PG&E to address the need for tranches to be as homogenous as possible on both the likelihood and consequence sides of the equation. Because ignitions in certain localized areas are more susceptible to large negative consequences of ignitions during Red Flag Warning (RFW) conditions than others, TURN fully endorses SPD's recommendation that the differentiation of tranches be based on both differences in assets that increase or decrease the likelihood of ignition and

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<sup>18</sup> SPD Report, p. 52.

<sup>19</sup> SPD Report, p. 48.

<sup>20</sup> SPD Report, p. 53.

on localized geographic areas that increase or decrease the potential consequence of an ignition if one occurs.

**C. TURN Recommends that PG&E Provides RSEs in Both the Without PSPS and With PSPS Scenarios**

TURN recognizes that SPD has strong reasons for recommending that PSPS not be presented as a mitigation, including the conclusion of the Wildfire Safety Division (WSD) on its decision on PG&E's 2020 Wildfire Mitigation Plan (WMP).<sup>21</sup>

However, PG&E shows every intention of continuing to employ PSPS as a strategy for preventing catastrophic wildfires. Because it is a program with significant costs, it is important to show the RSE for this program as well. However, PG&E needs to remedy the problems discussed in TURN's informal comments (pp. 13-14) regarding the failure to account for the full scope of adverse consequences from PSPS, which WSD also identified in its WMP decision.

Accordingly, TURN recommends that PG&E provide RSEs for the Wildfire risk mitigations under both the With PSPS and Without PSPS scenarios. In the With PSPS scenario, the RSE for PSPS needs to fix the current failure to take into account the entirely foreseeable societal impacts on both the safety and financial attributes in order to provide a more accurate and useful RSE.

**D. TURN Supports SPD's Recommendations to Disaggregate the Various System Hardening Mitigations**

TURN agrees with SPD's analysis on pages 62-63 of its Report regarding the need for PG&E to provide disaggregated RSE calculations for its Wildfire mitigation, particularly the

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<sup>21</sup> SPD Report, p. 59.

many mitigations that PG&E grouped under the System Hardening label. SPD's recommendations are consistent with TURN's recommendation in its informal comments (pp. 13-14) and which TURN reiterates here.

#### **E. TURN Supports SPD's Recommendations Regarding REFCL**

TURN agrees with SPD (pp. 64-65) regarding the significant promise that REFCL technology holds for preventing ignitions in a much more cost-effective way than current system hardening mitigations. TURN further agrees that PG&E should provide a mitigation alternative that makes maximum potential use of REFCL and provides updated RSE scores for this mitigation. In this regard, TURN reiterates its recommendation in its informal comments (p. 22):

PG&E's updated results for the 2023 GRC should include an alternative mitigation plan in which REFCL is deployed as fast as projections of equipment availability allow. This alternative plan should treat REFCL as the primary mitigation for circuits where REFCL is expected to be effective and optimize the use of other mitigations, including covered conductor and vegetation management, as supplemental mitigations. PG&E should be ready to update this analysis during its GRC proceeding. Under no circumstances should risk analysis that takes into account REFCL as a mitigation be deferred to the 2027 GRC.

### **IV. LOSS OF CONTAINMENT ON GAS TRANSMISSION PIPELINE**

#### **A. Insufficient Granularity of Tranches**

SPD's Report (p. 23) appropriately raises concerns regarding insufficient granularity of the tranches in PG&E's analysis of this risk. TURN's informal comments pressed this as a significant problem:

TURN believes the transmission pipe tranches are far too aggregated. For example, TURN believes there are likely to be differences in CoRE values associated with pipe having different diameters. All else equal, a rupture and ignition event for a pipe of 42 inches diameter is likely to have far larger consequences than the same event on a pipe with a 24-inch diameter. Moreover,

with respect to the LoRE, in the S-MAP test drive, PG&E's SMEs identified pipe attributes that affected failure rates. Furthermore, for distribution pipe, PG&E has created separate tranches for different types of pipe. Given that fact, it seems unlikely that different types of transmission pipe would not have different failure rates. In any event, Tranches 1 and 2 are far too large and mask important differences in LoRE and CoRE that need to be assessed in order to enable the Commission to have accurate information about the cost-effectiveness of mitigations. PG&E uses such information in deciding which pipe on its system to prioritize, and it should be used to develop more accurate RSEs for the GRC.

Given the relatively low RSEs for programs to mitigate this risk, it is especially important to have more granular information about where the risks are focused in order to target work to where it is most needed. Transition to electrification and avoiding stranded capital assets that will not serve their full useful lives accentuate the importance of targeting capital work to where it would be most cost effective.

SPD does not list addressing the insufficient granularity of tranches in its summary of recommended solutions on p. 28, which TURN views as an unfortunate oversight. Because of the high cost of proposed mitigations to address this risk, TURN reiterates the importance of having more granular tranche information in order to provide the Commission and parties the necessary information to develop appropriate scopes for these mitigation programs.

## **B. Using Correct Baseline for Analysis**

SPD (p. 23) points out that PG&E's report and workpapers fail to indicate whether the data used to develop frequency of risk events was correctly adjusted to reflect mitigation work performed in 2020-2022. This shortcoming in the transparency of PG&E's presentation should be addressed in PG&E's GRC. If the necessary adjustment has been made, PG&E should explain how the adjustment was determined. If the appropriate adjustment has not been made, this problem should be corrected in the GRC filing, with a full explanation of how it has been addressed.

## **V. LOSS OF CONTAINMENT ON GAS DISTRIBUTION PIPELINE**

### **A. More Granularity in Tranches is Needed**

Mitigations to replace plastic and steel pipe are expensive; indeed, the plastic pipe replacement program is one of the most expensive programs presented in the RAMP. At the same time, both of these programs have aggregate RSEs of 0.02, among the lowest scores in the RAMP. And even the highest RSE tranches that PG&E identified still have relatively low RSEs, none exceeding 0.16.<sup>22</sup> Further complicating the issue of how much pipe to replace is the transition to electrification and the desirability of avoiding stranded costs for assets that will not be in service for their full useful life. These issues all highlight the need for more granularity in tranches in order to understand which sub-groups of PG&E's large tranches are most deserving of the expenditure of limited ratepayer funding.

PG&E surely has more granular information that it uses to prioritize work in these massive programs based on risk. This information should be used to develop more granular tranches. Further breakdowns based on years of installation is a start, as SPD's Report indicates,<sup>23</sup> but PG&E should use all other factors it uses to prioritize this work to further increase the granularity of its tranches. In addition, TURN agrees with SPD recommendation that tranches be aligned with groups of assets that have known risk distinctions.<sup>24</sup>

## **VI. INCORPORATING FEEDBACK INTO GRC ANALYSIS AND NEED FOR AN ADDITIONAL WORKSHOP**

Issue 6 in the Scoping Memo is "whether RAMP feedback has been adequately incorporated into PG&E's Test Year 2023 GRC." In addition, the adopted schedule allows for

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<sup>22</sup> PG&E RAMP Report, p. WP 3-20.

<sup>23</sup> SPD Report, p. 34.

<sup>24</sup> SPD Report, p. 36.



additional workshops between the filing of reply comments on January 29, 2021 and PG&E's filing of its GRC by June 30, 2021. These elements of the Scoping Memo invite the question of whether an additional workshop should be scheduled in this interim period to assess the status of PG&E's incorporation of RAMP feedback into its GRC. TURN's position is that such a workshop should be scheduled.

TURN submits that it serves no one's interest, including PG&E, for PG&E to wait until its GRC filing to disclose how it has responded to the RAMP feedback. PG&E will clearly need to make a decision in the near future regarding how it will revise its RAMP analysis for the GRC in order to be able to provide results and supporting documentation with its GRC filing. A workshop in which PG&E presents its positions in response to RAMP feedback would provide a forum for parties to exchange views and has the potential to limit disputes in the GRC. Such an effort to resolve or narrow disputes in advance could avoid controversies that would delay resolution of a large and important case.

TURN recommends that such a workshop be scheduled in late February or early March, approximately one month after reply comments are filed. The main purpose of the workshop would be for PG&E to indicate how it is responding to the recommendations it has received from SPD and the parties in the RAMP. For recommendations it is accepting, PG&E would explain how it intends to implement the recommendation. For those it is rejecting, PG&E would provide an explanation for its decision. To enable parties to prepare for the workshop, PG&E should provide a document summarizing its responses to the recommendations, at least 3 business days in advance of the workshop. The workshop would thus provide an opportunity for SPD and the parties to listen to PG&E's intentions and to provide their comments in response. At the workshop, PG&E could very well learn that its implementation of a recommendation could be

improved or simplified or that its reasons for rejection of a recommendation do not hold up in light of the workshop discussion.

TURN submits that such a workshop would be consistent with the Scoping Memo and would provide a valuable opportunity to more effectively and productively integrate RAMP feedback into PG&E's GRC request.

Dated: January 15, 2021

Respectfully submitted,

By: \_\_\_\_\_/s/\_\_\_\_\_  
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## **EXHIBIT A**

### **TURN'S November 1, 2020 Informal Comments on PG&E's RAMP Report and Scenario Results**

## **Informal Comments of The Utility Reform Network (TURN) to the Safety Policy Division on PG&E's RAMP Report and Scenario Results**

The Utility Reform Network (TURN) appreciates this opportunity to provide the Safety Policy Division (SPD) with our comments on PGE's RAMP Report and Scenario Results, which we hope will aid SPD with its official report on PG&E's RAMP filing. These comments are divided into two parts. In Part I, we discuss the most significant problems we have identified with PG&E's Report to date, recognizing that TURN's analysis is continuing and still not complete. In Part II, we discuss alternative scenarios that TURN requested PG&E to perform, including TURN's interpretation to date of the results of those scenarios.<sup>1</sup>

### **PART I**

#### **The Most Significant Problems with PG&E's RAMP Analysis**

##### **1. Insufficient Granularity of Tranches**

A pervasive and serious problem with PG&E's RAMP Report is the lack of sufficient granularity in the tranches PG&E used for the analysis. To date, TURN has emphasized this problem with PG&E's analysis of the Wildfire risk, but it applies to many other risks in PG&E's report.

Row 14 of the S-MAP settlement requires each element (i.e., asset or system) in an identified tranche to "have homogeneous risk profiles (i.e., considered to have the same LoRE and CoRE)." In other words, to comply with the Settlement, all of the assets in each tranche should be grouped so that there are no significant differences in either the LoRE or the CoRE of those assets. If there is a meaningful difference, the asset group needs to be broken out into more granular tranches.

Sufficiently granular tranches are necessary to achieve the goal of providing accurate information for GRC decision-making about the cost-effectiveness of proposed mitigations. When assets with different LoRE and CoRE values are lumped together, the resulting average RSE values will mask differences in individual asset RSEs. This matters because a key objective of this quantitative analysis is to identify mitigations that will provide the greatest risk-reduction value for PG&E's customers, employees, and the public at large. Using average RSE values that do not account for individual asset differences prevents the Commission from having a record that allows it to make fine-tuned decisions about which mitigations to approve and in what scope, given affordability and other constraints.

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<sup>1</sup> For SPD's ease of reference, in these informal comments, TURN has underlined its recommendations for conclusions in SPD's report.

An example will illustrate the concern. The table below compares two sets of RSE values for the same assets: one based on a less granular tranche analysis and the other on a more granular analysis.

**Table 1: Granular Tranches Give More Accurate and Useful RSE Values**

	<b>M1</b>	<b>M2</b>		<b>M1</b>	<b>M2</b>
<b>Tranche 1</b>	10.0	5.0	<b>Tranche 1.1</b>	25.0	12.0
			<b>Tranche 1.2</b>	4.0	7.0
			<b>Tranche 1.3</b>	1.0	0.5
<b>Tranche 2</b>	1.0	3.0	<b>Tranche 2.1</b>	4.0	8.0
			<b>Tranche 2.2</b>	0.1	0.2

In the columns on the left, only two tranches are used to determine the RSEs for two mitigations, M1 and M2. In the columns on the right, Tranche 1 is broken down into 3 tranches and Tranche 2 is subdivided into two tranches. If the Commission were inclined to approve mitigations with an RSE of 5.0 or greater, the analysis on the left would argue for approving both mitigations for all of Tranche 1 and rejecting both mitigations for all of Tranche 2.

However, with the more granular information on the right side, the Commission would see that, for M1, the RSEs exceed the 5.0 benchmark *only for part of Tranche 1*, namely Tranche 1.1. In addition, the Commission would learn that the M2 mitigation exceeds the RSE benchmark for part of Tranche 1 (Tranche 1.2) and part of Tranche 2 (Tranche 2.1). In sum, contrary to what was indicated by the less granular analysis, cost-effectiveness would be maximized by performing M1 for only a subset of Tranche 1 and by performing M2 for a subset of Tranches 1 and 2.

## **1.1 Wildfire Risk**

The problem of insufficient granularity of PG&E's tranches for the Wildfire Risk has already been well discussed in the workshops and other meetings. PG&E's distribution and transmission tranches are clearly not in compliance with the Settlement. It is simply not credible that there are no meaningful differences in either the LoRE or the CoRE for the very large number of miles in each of the following tranches:

- HFTD Distribution (To Be Hardened) – 6,929 circuit miles
- HFTD Distribution (Remainder) – 18,310 circuit miles

- HFTD Transmission -- 5,525 circuit miles
- Non-HFTD Distribution – 55,300 circuit miles
- Non-HFTD Transmission – 12,600 circuit miles

TURN encourages SPD to call out these massive, non-homogenous tranches as an obvious failure to comply with the Settlement and as a disservice to the Commission’s efforts to obtain useful cost-effectiveness data for GRC decision-making.

Although none of these excessively large tranches are defensible, TURN is most concerned about the HFTD tranches, since this is the part of the system with the most risk and where we expect wildfire mitigations to be focused. However, to the extent mitigations are proposed for any non-HFTD miles, these tranches also need to be broken down into more homogenous tranches.

PG&E’s own data from its 2019 GRC make clear that the Distribution - To be Hardened” and “Distribution - Remainder” tranches are not sufficiently granular. Based on data from PG&E’s 2019 GRC filing summarized in Table 2 below (reflecting TURN’s requested tranche scenario),<sup>2</sup> 60% of the risk for the Distribution- To Be Hardened tranche is found in approximately 2,300 (see Rows 2-7), or about 30% of the 6,900 miles in that tranche. In addition, the Risk Unit per Mile column shows risk is generally higher in the more granular tranches towards the top of the table, falling off considerably beginning with Row 8.<sup>3</sup>

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<sup>2</sup> This scenario is discussed in Part II, Section 1.2 of these comments.

<sup>3</sup> As discussed in Part II, Section 1.2, TURN is not contending that the rows in Table 2 are sufficiently granular to satisfy the requirements of the Settlement. Each row likely masks major differences in LoRE or CoRE that warrant more granular tranches.

**Table 2: Risk Allocation by Sub-Tranche of “Distribution – To be Hardened” and “Remainder” Circuits**

Distribution - To be Hardened Tranche	Incremental Circuit Miles	Cumulative Circuit Miles	LoRE (Events/Year)	Wtd Average CoRE	Tranche Risk	Percent of Total Risk	Risk Units per Mile
2	325	325	2.3	1022.4	2,319	10%	7.14
3	434	759	2.5	956.8	2,427	10%	5.59
4	397	1,156	3.0	812.9	2,415	10%	6.09
5	395	1,551	2.6	911.3	2,355	10%	5.96
6	355	1,906	2.9	837.9	2,436	10%	6.86
7	392	2,298	3.2	741.7	2,376	10%	6.06
8	625	2,922	3.6	676.5	2,403	10%	3.85
9	616	3,538	3.8	625.7	2,380	10%	3.86
10	396	3,933	2.5	491.4	1,211	5%	3.06
11	463	4,396	2.8	431.5	1,196	5%	2.58
12	1,161	5,557	3.2	374.9	1,201	5%	1.03
13	20,038	25,595	37.7	31.7	1,197	5%	0.06
<b>TOTALS</b>	<b>25,595</b>		<b>70.0</b>		<b>23,915</b>	<b>100.0%</b>	<b>0.93</b>

Source: TURN analysis of PG&E "Dx Prioritization Analysis"

Even the level of granularity reflected in Table 2 is not ideal because, based on PG&E’s data, the LoRE and CoRE values for each circuit within each of these tranches differ. For example, PG&E undoubtedly knows that particular locations within HFTDs are more susceptible to fire weather conditions or high fuel content than other HFTD areas

PG&E should also consider designing tranches based on the specific characteristics of individual equipment types that tend to increase the likelihood of occurrence of wildfires. For example, a distribution circuit includes poles, wires, transformers, reclosers, and other identifiable assets. Each of these types of equipment has different failure rates and different likelihoods of causing a wildfire. These differences could be used to create separate equipment-specific tranches. In Chapter 11 of its RAMP filing, PG&E discusses failures of DOH assets by equipment type and has created tranches based on reliability performance. It is reasonable to assume that some of these failures can lead to wildfires.

The bottom line is that PG&E’s Report does not even approach the level of granularity that the Settlement mandates and that the Commission needs in order to make informed judgments in the GRC about which mitigations should be approved and in which scope. As discussed further in Part II, Section 1 below, PG&E should be advised to work with the parties to develop a much more granular set of tranches for the Wildfire risk to determine RSEs for PG&E’s upcoming GRC filing.

## 1.2 Gas Transmission and Distribution Pipeline Risks

In the RAMP, PG&E identified four tranches for the 6,682 miles of transmission pipe on its system.<sup>4</sup> Of these four tranches, PG&E identified two tranches (Tranches 1 and 2) with a total of 5,038 miles of transmission pipe that account for 81% of transmission pipeline risk, and a third tranche of 816 miles that accounts for 19% of transmission pipeline risk.<sup>5</sup> These tranches contain pipe of different vintage, different diameter, and different manufacturing techniques, along with pipe operating at different operating pressures. These differences, and others, are required to be tracked under pipeline Integrity Management programs, precisely because they affect pipeline failure rates.

In the S-MAP Test Drives, PG&E provided data at the individual pipe segment level that included many descriptive pipe characteristics. But in the RAMP report, PG&E claims that “it was difficult to determine which attributes were best indicator of overall asset health.”<sup>6</sup> PG&E has never explained the basis for this claim, nor described the analysis the company undertook to make its determination that no attributes were indicators of asset health.

TURN believes the transmission pipe tranches are far too aggregated. For example, TURN believes there are likely to be differences in CoRE values associated with pipe having different diameters. All else equal, a rupture and ignition event for a pipe of 42 inches diameter is likely to have far larger consequences than the same event on a pipe with a 24-inch diameter. Moreover, with respect to the LoRE, in the S-MAP test drive, PG&E’s SMEs identified pipe attributes that affected failure rates. Furthermore, for distribution pipe, PG&E has created separate tranches for different types of pipe. Given that fact, it seems unlikely that different types of transmission pipe would not have different failure rates. In any event, Tranches 1 and 2 are far too large and mask important differences in LoRE and CoRE that need to be assessed in order to enable the Commission to have accurate information about the cost-effectiveness of mitigations. PG&E uses such information in deciding which pipe on its system to prioritize, and it should be used to develop more accurate RSEs for the GRC.

TURN similarly believes the PG&E’s distribution pipe tranches are too aggregated, for many of the same reasons. Different sizes of distribution pipe, different pipe manufacturing methods, and so forth, will lead to different LoRE and CoRE values within each of PG&E’s tranches, thus limiting the accuracy of the resulting RSE calculations.

It is also the case that PG&E does not use asset condition to delineate tranches, even though asset condition is likely an important determinant of LoRE. It is reasonable to ask why PG&E is not

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<sup>4</sup> *Id.* p. 7-9, Table 7-2.

<sup>5</sup> *Id.* p 7-7 and p. 7-9, Table 2.

<sup>6</sup> *Id.* at 7-8.



using this important information when PG&E specifies the tranches. If PG&E does not know the condition of the assets at present, it is reasonable to ask what PG&E is doing to determine asset condition, so that the tranches can be based on condition-dependent LoRE.

PG&E should be advised to significantly improve the granularity of its gas transmission and distribution tranches in the updated analysis for the GRC.

## **2. Failure to Assess PG&E's Operational Failures as a Driver of Wildfire Risk**

PG&E's RAMP Report ignores the most obvious driver of catastrophic wildfires at PG&E – PG&E's failure to meet operating standards and to perform its work properly. In 2017, Cal FIRE determined that 11 of the 17 North Bay fires resulted from PG&E violations of tree trimming requirements. With respect to the 2018 Camp Fire, PG&E plead guilty to the crime of involuntary manslaughter – which means acting with a reckless disregard for public safety. And, according to media reports, Cal FIRE has found that reckless conduct by PG&E is responsible for the 2019 Kincade Fire.<sup>7</sup> Moreover, the Federal Court Monitor, appointed as a condition of the probation arising out of PG&E's San Bruno convictions, has issued two detailed reports – one in 2019 and another just recently in October 2020 -- finding serious deficiencies in how PG&E has carried out its vegetation management work and its facility inspections.<sup>8</sup> Absent these operational failures, many of the most serious wildfires of the past three years would not have occurred.

As the *San Francisco Chronicle* said in a recent editorial titled “PG&E Still Can't Seem to Do Its Job,” PG&E's “Plan A should be maintaining its power lines and other infrastructure while clearing nearby vegetation” but “PG&E is still struggling to tend to this basic task.”<sup>9</sup>

Nevertheless, despite this history, PG&E's Wildfire Risk analysis refuses to acknowledge its operational failures as a key driver of catastrophic wildfires. Instead, PG&E wants the Commission to accept its fantasy view of the world in which these operational failures have nothing to do with the wildfires PG&E has caused. By excluding the driver of operational failures, PG&E's risk mitigation analysis ignores what is likely the most important mitigation of all – the Plan A of simply doing its work properly. Spending billions of dollars on vegetation management and facility inspections is not cost-effective if the work is not performed correctly.

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<sup>7</sup> CalFIRE's Kincade Fire report is not public because it has been referred to Sonoma County prosecutors for criminal prosecution of PG&E.

<sup>8</sup> October 16, 2020 and July 26, 2019 Letters from Mark Filip, Federal Monitor, to Judge William H. Alsup.

<sup>9</sup> *San Francisco Chronicle*, “Editorial: PG&E Still Can't Seem to Do Its Job,” October 27, 2020, found at: <https://www.sfchronicle.com/opinion/editorials/article/Editorial-PG-E-still-can-t-seem-to-do-its-job-15676777.php>

When operational failure is included as a driver, PG&E is forced to focus leadership attention on relatively low-cost measures (such as improved Quality Assurance and Quality Control) that would provide a major risk reduction benefit.

By excluding this key driver of risk, PG&E is inviting us to accept the myth that its operational failures are not a source of risk and, thus, do not need attention from its leaders and its regulators -- that expensive mitigation programs should be the only focus. Although significant spending on wildfire mitigation programs will be necessary, a true and correct portrait of PG&E's Wildfire Risk requires that the considerable risk resulting from PG&E's operational failures be recognized and that the risk reduction benefits from fixing those problems be quantified. Absent inclusion of operational failures as a driver, the risk analysis is incomplete and insufficient, to the detriment of ratepayers who will be required to pay billions for wildfire mitigation programs.

TURN repeatedly raised this issue with PG&E in the workshops and other party meetings in this case - to no avail. It is clear that PG&E leadership<sup>10</sup> has no interest in honestly acknowledging the major contribution that operational failures make to PG&E's wildfire risk. This stance is consistent with PG&E's posture in the recent bankruptcy case before the CPUC. In the decision in that case, the Commission characterized PG&E's recent safety performance as ranging "from dismal to abysmal" and found as "a cause for concern" PG&E's reluctance "to take ownership of its safety history and acknowledge its failings."<sup>11</sup>

It should therefore be clear that PG&E will not fix this omission and provide an accurate Wildfire Risk analysis unless it is pressured to do so by the Commission. An important start would be for SPD to identify the omission of operational failures as a risk driver as a major deficiency in PG&E's Report that should be corrected in the updated GRC analysis. No one likes confrontation, and TURN takes no joy in highlighting this problem, but wildfires pose an urgent and catastrophic threat. This is not the time to allow discomfort with controversy to get in the way of a truthful and complete analysis of PG&E's wildfire risk and the necessary mitigations.

### **3. Problems with PG&E's Multi-Attribute Value Function (MAVF)**

The MAVF is the foundation upon which the consequences of risk events are measured. Unreasonable judgments in framing the MAVF can have a significant impact on the calculations of pre- and post-mitigation risk scores and therefore on the RSE calculations. PG&E made four unreasonable choices in fashioning the MAVF it used for its RAMP analysis.

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<sup>10</sup> TURN wishes to be clear that it is not faulting the PG&E RAMP analysts who have been the face of this case for PG&E. The problem clearly lies with PG&E's leadership refusing to take ownership of the company's operational problems, which all but guarantees the perpetuation of those problems.

<sup>11</sup> D.20-05-053, p. 17.

### 3.1 Nonlinear Scaling Functions for Safety and Financial Attributes

PG&E's MAVF has nonlinear scaling functions for both safety and financial consequences. These scaling functions should be replaced by linear scaling functions.

PG&E's nonlinear scaling functions lead to preferences that defy common sense. Generally, PG&E's nonlinear scaling functions decrease the value of mitigating the risk of less consequential but more frequently occurring events, compared with the value of mitigating the risk of more consequential but less frequently occurring events. Although PG&E has stated it wishes to focus on events with larger damages, the non-linear scaling functions mean that PG&E values reduction in the level of an attribute (e.g., equivalent fatalities) associated with a catastrophic event by more than ten times an equivalent reduction in a smaller-scale event. This is not reasonable because the repeated occurrence of the more frequently occurring event is expected to inflict more damage, measured in dollars or fatalities, over a fixed time period, say a year, than the infrequent occurrence of the more consequential event, such as a wildfire.

For example, using PG&E's nonlinear scaling function for the Safety attribute, the scaled value of reducing the expected number of equivalent fatalities from 11 to 10 is 1.06 scaled units. The scaled value of reducing the expected number of equivalent fatalities from 1 to 0 is 0.10 scaled units, less than one-tenth the former amount. As such, if an event that results in 11 fatalities is expected to occur once per year but the event that results in 1 fatality is expected to occur 10 times per year, then the mitigation that reduces the expected number of deaths from 11 to 10 is preferred to the mitigation that reduces the expected number of deaths from 10 to 0 for 10 separate events.

In other words, PG&E would prefer to avoid one death associated with an event that would otherwise be expected to cause 11 deaths, compared with avoiding 10 deaths associated with avoiding 10 separate events, each expected to lead to one death. This is not a rational tradeoff and should not be accepted by the Commission.

The non-linear scaling function for the Financial attribute is also counterintuitive and inconsistent. Based on this scaling function, PG&E would prefer to reduce the expected financial consequences of an event by \$100 million, from \$600 million to \$500 million, compared with avoiding 10 separate events, each having a \$100 million loss. In other words, PG&E would prefer to accept a total of \$1 billion in losses from 10 separate events in order to avoid a single \$100 million loss from a larger event. Again, this is not rational and should not be accepted by the Commission.

Therefore, the nonlinear scaling functions for safety and financial consequences should be replaced by linear scaling functions.

### 3.2. Capped Scaling Functions

The PG&E scaling functions are capped at the upper limit of the attribute measured in natural units. This capping assigns the scaled value of 100 to any outcome that is greater than or equal to the upper limit of the attribute measured in natural units. For example, a financial loss of \$100 billion is valued the same as a financial loss of \$5 billion, or a catastrophe that results in 500 deaths is valued the same as a catastrophe that results in 100 deaths. This makes no sense.

The caps should be removed. Nothing in the Settlement requires capped scaling functions. Instead, extending the scaling functions beyond their upper limits in natural units is simple and reasonable.

### 3.3. Inflated Statistical Value of Life (SVL)

The statistical value of life (SVL) is a measurement of the value of mitigating the risk of death. Importantly, SVL is not a valuation of any individual life. Instead, it is a measure of how much society is willing to pay for marginal reductions in the risk of dying across a broad population. The SVL is implied in the MAVF and is found by comparing the ranges (in natural units) and the weights of the Safety and Financial Consequences attributes. For PG&E's MAVF, the implied SVL is \$100 million. This is because the weight of the Safety attribute is 0.50, the weight of the Financial Consequences attribute is 0.25, and the ranges are 100 equivalent fatalities (EFs) and \$5 billion, respectively. Hence, 100 EFs have the same weight as \$10 billion, which implies that the SVL is \$100 million per EF. In contrast, the accepted value used by federal agencies for safety policy analysis is approximately \$10 million.<sup>12</sup>

PG&E's valuation means that it expects society to value a 1% reduction in the likelihood of occurrence of a single EF at \$1 million. In other words, a mitigation that accomplished this and nothing else each year is worth an expenditure of \$1 million per year. This is an order of magnitude greater than the values used by U.S. government agencies for many years to weigh environmental and safety regulations that reduce risk.

To comport with accepted values used by federal agencies in risk analysis, the SVL should be reduced to a value of \$10 million. As discussed in Part II, Section I below, TURN proposed alternative MAVF scenarios to address this problem.

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<sup>12</sup> The most recent values used by the U.S. EPA and U.S. Dept. of Transportation, which are based on studies from the academic literature, can be found in the following documents: U.S. EPA, "[What Value of a Statistical Life Does EPA Use](#)." The EPA uses a value of \$7.4 million in 2006\$, which is approximately \$10 million in 2020\$. See also, U.S. Dept. of Transportation, "[2016 Revised Value of a Statistical Life Guide](#)," August 8, 2016. The DOT uses a value of \$9.6 million in 2016\$, also equivalent to about \$10 million in 2020\$. The DOT also estimates the value of a severe injury at 26.6% of the SVL, or about \$2.5 million.

### **3.4. Insufficient and Missing Attributes**

The attributes in the MAVF should address all the different factors that affect PG&E's ratepayers, employees, and the public that should be considered in decisions about which risk mitigation activities to pursue. PG&E has identified three of the important attributes at the top level—Safety, Reliability, and Financial Consequences. However, PG&E has not included other attributes that may be important. When attributes are missing, the MAVF has blind spots for types of consequences that are not considered, which could prevent PG&E from identifying the most cost-effective mitigations.

Among the attributes that PG&E failed to include are Environmental Consequences, Customer Satisfaction, and Employee Satisfaction. Ratepayers should expect good performance from PG&E in all these dimensions. Attributes can and should be specified that address each of these impacts.

Further, PG&E's Safety attribute does not distinguish among the safety consequences affecting the public, PG&E employees, and PG&E contractors (fatalities or serious injuries). There is reason to believe that those consequences could be weighted differently.

The natural units of the Reliability attribute are either (electricity) customer minutes interrupted or (gas) customers affected per event. These are insufficiently detailed. Such descriptors as Customer Type (Industrial, Commercial, Retail) and indices such as SAIFI and SAIDI should be used to specify with greater accuracy the effects of a mitigation.

## **4. Insufficient Transparency**

TURN has devoted significant time and resources to trying to understand the basis for inputs and intermediate calculations that have a significant impact on RSEs. While we appreciate the efforts of PG&E's analysts to attempt to explain the details of the calculations, TURN still found it unduly difficult to understand how PG&E determined certain inputs and intermediate outputs in its analysis. Below, we discuss some of the more significant problems we encountered. PG&E should be advised to improve the transparency of its inputs and calculations in the updated analysis for its 2023 GRC.

### **4.1. Lack of Transparency Regarding Determination of Effects of a Mitigation**

The risk reduction of a mitigation is based on a percentage change to LoRE or CoRE (or both) claimed by PG&E as a result of applying a mitigation to a tranche. However, how PG&E determined the reductions claimed for a mitigation over the various subdriver-risk event-outcome combinations within a tranche is not transparent.

As an example, we will describe our efforts to understand the basis for the mitigation effectiveness values for Wildfire Risk mitigations. In workpaper EO-WF-25\_Mitigation

Effectiveness WP.xlsx, the worksheet “M2 | Summary Analysis” contains (in column D) effectiveness percentages of system hardening on different driver-subdriver combinations. The worksheet “M2 |SME Input” has 5,095 rows with what appear to be combinations of causes, involved equipment, equipment condition, and, in column F, a “System Hardening Effectiveness” designation. There are four designations “All,” “High,” “Medium,” and “Low.” The workpaper never explains what these designations mean, nor how PG&E calculated the very precise effectiveness percentages in Column D in the worksheet “M2 | Summary Analysis.”

TURN had to ask a specific data request for what the designations meant and how the effectiveness percentages were calculated. In response, PG&E provided another workpaper, with hundreds of thousands of outages. In that workpaper, TURN-0004-Q01: RAMP-2020\_DR-TURN\_004-101Atch01, it appears PG&E assigned an assumed effectiveness category to each outage. That is, if the circuit was hardened, what would be the effectiveness on reducing the likelihood of an outage. In column CJ of the worksheet, “All Outages Data Set,” of this workpaper, we learn the meaning of the four designations. (“All” = 90%, “High” = 70%, “Medium” = 50%, “Low” = 20%). Again, however, there was no discussion of how the effectiveness percentages in EO-WF-25\_Mitigation Effectiveness WP were calculated. Nor was this discussed in the Workpaper User Guide or RAMP filing. It was not until a session with PG&E that we were told PG&E aggregates all of these individual values by subdriver, e.g., all of the balloon outages, animal outages, etc., and then calculates the average effectiveness values for each subdriver based on the assumed individual outage effectiveness levels.

An inability to determine how effectiveness percentages were calculated for Wildfire mitigations from documentation or workpapers PG&E provided with its filing does not meet the transparency requirement of the Settlement.

## **4.2 Lack of Clarity Regarding How LoRE is Determined**

PG&E’s Report and documentation is not clear regarding how LoRE is defined and measured, both pre- and post-mitigation. A key problem is that PG&E has not made clear whether PG&E is using: (1) joint probabilities, i.e., the probability of joint occurrences of multiple events; or (2) conditional probabilities, i.e, the probability of an event given the occurrence of another event or events. PG&E’s documentation did not specify the computations sufficiently to clarify this difference.

This is very important because how PG&E defines LoRE at the tranche/subdriver/outcome level determines how PG&E computes the total LoRE (which PG&E says is aggregated), how it computes the risk score, and how it assesses the effectiveness and cost of a mitigation.

For example, consider a mitigation that is said to reduce the LoRE in relation to the subdriver balloons and the outcome ignition by some percentage, say 50%. PG&E is not clear whether that means that the probability of occurrence of the subdriver balloons has been reduced by 50% or that the conditional probability of the occurrence of the outcome ignition given the subdriver balloons has occurred is reduced by 50%. Nor do we know which type of probability PG&E's experts had in mind when they said that the mitigation is 50% effective.

Further, the costs of two different mitigations that will do either will almost surely differ. It is reasonable to expect that the cost of reducing the incidence of balloons by 50% is different from the cost of reducing by 50% the likelihood of occurrence of an ignition after a balloon has struck. We do not know which costs apply because we do not know how the LoRE is defined.<sup>13</sup>

The lack of clarity regarding how PG&E's LoRE values are determined create significant problems in assessing the reasonableness of PG&E's risk scores and RSE calculations.

## **5. Failure to Account for Full Scope of Adverse Consequences from PSPS**

An important issue is whether PG&E fully accounted for all of the risks from PSPS events in its analysis.

PG&E admits that it did not take into account any safety risks from PSPS. This runs contrary to what we now know about the dangers to health and safety from being without power for extended periods. These include:

- Risks of fire or carbon monoxide poisoning from improper use of generators<sup>14</sup> and other harms to health (respiratory, increased cancer risk) from use of gasoline or diesel-powered generators.<sup>15</sup> As PSPS events now seem to be a long-term strategy for PG&E and the pandemic makes it more essential to have power, increasing numbers of homes and businesses can be expected to resort to use of generators.

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<sup>13</sup> An example is found in PG&E's file WP-User Guide-1.xlsb. In tab Input LoRE, row 4, column F is the number 0.003623188. Is this the probability of the joint occurrence of the tranche Not A Current Replacement Priority and the sub-driver Primary Cable Failure and the outcome Asset Failure/Not Catastrophic? Or is this the conditional probability of the joint occurrence of the sub-driver Primary Cable Failure and the outcome Asset Failure/Not Catastrophic *given* the occurrence of the tranche Not A Current Replacement Priority? Or is this the conditional probability of the occurrence of the outcome Asset Failure/Not Catastrophic *given* the joint occurrence of the tranche Not A Current Replacement Priority and the sub-driver Primary Cable Failure? Or is it something else? Nowhere is it clearly stated. So we do not know.

<sup>14</sup> An overloaded generator used during a PSPS event is suspected of causing a fire in the Oakland hills that burned two houses: <https://www.sfgate.com/california-wildfires/article/Oakland-Hills-fire-homes-red-flag-warning-15678536.php>

<sup>15</sup> [https://ww2.arb.ca.gov/sites/default/files/2020-01/Emissions\\_Inventory\\_Generator\\_Demand%20Usage\\_During\\_Power\\_Outage\\_01\\_30\\_20.pdf](https://ww2.arb.ca.gov/sites/default/files/2020-01/Emissions_Inventory_Generator_Demand%20Usage_During_Power_Outage_01_30_20.pdf)

- Inability of some customers to access 911 when power is out. A home fire in San Anselmo earlier this week in which a person died could not be promptly reported to 911 because of the PSPS outage.<sup>16</sup>
- Increased risk of fire from use of candles for lighting.
- Increased risk of accidents (falls and traffic accidents) when power is out
- Health impacts of lost use of medical devices (many customers who are eligible for medical baseline may not be contacted by PG&E)

While PG&E states that it does include some of the non-safety impacts of PSPS in the Reliability consequence attribute, the scope of the financial harms suffered by society that are included in PG&E's analysis is unclear. Initially in the workshops, PG&E claimed that it viewed harms such as economic losses to businesses and workers as "indirect" consequences that it did not include in its analysis. However, in a Scenario Analysis call on October 28, 2020, PG&E asserted for the first time that its Reliability attribute counts such economic losses. PG&E needs to further substantiate this new contention, which TURN has not been able to probe in time for these comments.

In any event, PG&E's assessment of the detriments from PSPS is clearly deficient in light of the failure to consider the evident safety risks from extended loss of power to homes, businesses and municipal lighting, including street lights. In this respect, it is clear that PG&E has overstated the RSE of PSPS as a mitigation for wildfire risk. And further study is needed to assess the extent to which PG&E fails to fully capture economic risks to society.

PG&E should be advised to remedy the deficiencies in its PSPS analysis in the revised analysis it undertakes for the GRC.

## **6. Aggregation of Wildfire Mitigations that Should be Separately Assessed**

The usefulness of PG&E's RAMP analysis is diminished whenever it groups different mitigation activities together and only provides an RSE for an aggregated group. For example, PG&E did not assess targeted undergrounding separate from covered conductor installation, instead including both mitigations under the single aggregated mitigation it calls System Hardening (M2). As a result, in PG&E's analysis, the parties and CPUC are unable to compare the RSEs of these two independent mitigations.

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<sup>16</sup> <https://seattle.cbslocal.com/video/4822592-elderly-woman-dies-in-san-anselmo-house-fire/>



The two most glaring examples of inappropriately aggregated mitigations were both in the Wildfire Risk chapter. What PG&E calls Enhanced Vegetation Management (EVM) (M1) actually consists of four different types of activities:<sup>17</sup>

- A. Enhanced radial clearance;
- B. Overhang trimming;
- C. Identification and mitigation of trees with the potential to strike; and
- D. Fuel reduction.

Similarly, what PG&E calls System Hardening actually consists of six different activities:<sup>18</sup>

- A. Replacement of bare overhead primary and secondary conductor with covered conductor, including pole replacements where necessary to support new, heavier conductor;<sup>19</sup>
- B. Pole replacements unrelated to the installation of covered conductor, if applicable;
- C. Replacement of existing primary line equipment (this should be further broken out by type of equipment e.g. fuses, switches, etc.)
- D. Replacement of existing transformers with models that contain fire resistant FR3 insulation fluid;
- E. Undergrounding; and
- F. Circuit removal.

For its updated GRC analysis, PG&E should be advised to provide costs, risk reductions, and RSEs for each of these individual activities.

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<sup>17</sup> See pp. 10-34-35 of PG&E's RAMP filing.

<sup>18</sup> PG&E RAMP Filing, pp. 10-35-36.

<sup>19</sup> Necessary pole replacements shall be quantified and incorporated into the unit cost (dollars per circuit mile) of covered conductor in a transparent manner. PG&E should include only those pole replacement costs that are necessary to support the additional weight of covered conductor, and should transparently calculate the unit cost of covered conductor installation, documenting all assumptions.

## 7. Elements Missing from PG&E's Analysis

### 7.1 Assessment of Mitigations that PG&E Calls "Controls"

PG&E states that the schedule for this RAMP did not allow it to assess mitigations that are currently in place, which it refers to as "controls." Contrary to PG&E's claim,<sup>20</sup> nothing in the RAMP Settlement Agreement carved out "controls" from the mitigations that are required to be assessed under Step 3 of the Settlement. Row 26 requires the RAMP filing to provide a ranking of "all RAMP mitigations" by RSE. If controls were to be excluded from this requirement, this exclusion would have been made clear in Row 26, or elsewhere in the Settlement. There is no such carve-out language in the Settlement, and TURN remains surprised and disappointed that PG&E has taken this position, which is very different from what TURN understood the parties to be agreeing to.

In addition, as SPD is aware, SPD's predecessor criticized PG&E's practice of not assessing controls in SED's report on PG&E's previous RAMP filing.<sup>21</sup>

Wildfire vegetation management (VM) provides an example of the importance of assessing all mitigations, whether new or current. Much of the PG&E's VM mitigation work is done under what PG&E refers to as its "routine" or "compliance" programs. PG&E's Report only assesses "enhanced" vegetation management (EVM), which (as discussed in Section 6 above) consists of a variety of different programs to supplement the routine work. PG&E's Report does not provide RSEs for any of the routine/compliance programs it conducts at huge ratepayer expense.

However, the boundary between routine/compliance work and enhanced VM is unclear. In HFTDs, the recommended clearance distance at time of trimming is now 12 feet (increased from 4 feet), which raises the question of whether trimming to 12 feet is now the current routine practice (which would make it a "control" in PG&E's parlance) or enhanced. In addition, it is unclear whether removal of dead and dying trees that could come into contact with utility lines is "routine" or "enhanced." Utilities have argued that such work is required under ESRB-4, yet such work needs to be distinguished from removal of green, living trees which is definitely not required work. Rather than drawing difficult lines concerning what constitutes "control" work, all major mitigation programs should be evaluated.

Moreover, without an assessment of the cost-effectiveness of the routine VM work, it is not possible to evaluate the *incremental* cost-effectiveness of the various EVM programs which are

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<sup>20</sup> PG&E RAMP Report, p. 3-53.

<sup>21</sup> SED Report, I.17-11-003, March 30, 2018, p. 4.

also extremely costly.<sup>22</sup> The cost effectiveness of *all* VM programs as compared to other Wildfire mitigation efforts needs closer scrutiny from the Commission, as, after each PSPS event, PG&E routinely reports numerous tree contacts that could have sparked a wildfire had lines been energized. These reports are an admission of ineffective or failed vegetation management, and the public has the right to ask whether VM programs are cost effective -- particularly as new technologies such as REFCL are emerging as alternative and potentially more cost-effective wildfire mitigation measures.

PG&E's Report suggests that it *may* assess mitigations in place for its GRC filing, but PG&E remains non-committal about whether and to what extent it will do the required assessments.<sup>23</sup> This is unacceptable. PG&E should be advised that it will be expected to provide RSEs for all mitigations, whether new or in place, in the updated analysis it provides in its GRC.

## **7.2 Assessment of the Incremental Benefits of a Mitigation Where Another Mitigation Is Previously Deployed**

As shown on PDF pages 30-31 of PG&E's July 14, 2020 Workshop slides, PG&E made an effort to account for the fact that, when multiple mitigations are applied to a risk, the risk reduction of each individual mitigation is reduced. PG&E showed how, in such cases, it allocated risk reduction based on the marginal risk reduction benefits of each mitigation.

However, PG&E's approach only helps when it has already been determined that multiple mitigations will be used, which is a classic example of putting the cart before the horse. In some, perhaps many, situations in which there are multiple mitigations that can be deployed, a key question that this analysis is designed to help with is what are the RSEs when one mitigation is deployed as the *primary* mitigation (i.e., deployed first) and another is applied, if at all, only as a *supplement* to (i.e., after) the primary mitigation has been performed. PG&E's analysis does not answer this important question of the *incremental* benefits of applying a second mitigation after a first mitigation has been deployed.

Think of, for example, REFCL in relation to other wildfire mitigations. Assuming REFCL is as effective in preventing ignitions as hoped, then REFCL would be a good candidate to serve as a primary wildfire mitigation, particularly given its relative lower cost. An important question then would be, what are the incremental RSEs of applying covered conductor (CC) or vegetation management (VM) after REFCL has been deployed. PG&E's analysis does not

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<sup>22</sup> WSD has criticized the utilities generally, and PG&E specifically, for failing to assess the incremental benefits of "enhanced" mitigations in comparison to routine activities. *See, e.g.,* WSD-02 (Guidance applicable to all utilities), p. 26; WSD-03 (PG&E), pp. 33-34.

<sup>23</sup> PG&E RAMP Report, pp. 3-53 to 3-54.

address this issue -- or the related issue of what are the incremental benefits of CC and VM after the other has been deployed.

To show the shortcomings of PG&E's portfolio allocation approach, consider the following example. M1 and M2 are two mitigations each with 80% effectiveness. Under PG&E's allocation approach, the two mitigations together would achieve 96% effectiveness and each mitigation would be determined to be 48% effective. PG&E's RSEs would be based on 48% effectiveness for each mitigation.

However, if M1 is deemed the *primary* mitigation (e.g., because, like REFCL it is relatively inexpensive), then it should be viewed as having 80% effectiveness and M2, the supplemental mitigation, should be viewed as having only 16% incremental effectiveness. When these effectiveness values are used, the RSEs could be very different from the RSEs that PG&E calculated. These *incremental* RSEs are missing from PG&E's analysis and are critical information to help the parties and the Commission in their analysis of the optimal portfolio of mitigations.

Accordingly, where decisions about the deployment of multiple mitigations (including mitigations that PG&E calls controls) need to be made, PG&E needs to augment its analysis to show incremental RSEs based on the order of deployment of the mitigations. This results in a more accurate measurement of the marginal or incremental value of a mitigation. As indicated above, this type of analysis is particularly necessary for Wildfire Risk mitigations, where a variety of mitigations can be used to prevent ignitions.

## PART II

### Discussion of Scenario Analyses

This Part of TURN's informal comments discusses the alternative scenarios that TURN has asked PG&E to perform to date and provides TURN's interpretation of the results. In addition, we briefly discuss the implications of the important REFCL scenario requested by SPD.<sup>24</sup>

#### **1. TURN Scenarios to Increase Granularity of Wildfire Risk Analysis**

TURN requested alternative Wildfire scenarios to attempt to address two of the problems discussed in Part I above – insufficient granularity of tranches (Section 1.2) and inappropriate aggregation of mitigations (Section 6).

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<sup>24</sup> TURN did not have sufficient time to review in any detail the other scenarios. Accordingly, our silence concerning those other scenarios does not mean we view them as unimportant.

## 1.1 Breakdown of Mitigations by Component Programs

TURN requested that System Hardening and EVM be broken down into their component programs. The results provided by PG&E show, as expected, that RSEs vary considerably among the component programs, providing richer, more useful information for the Commission and parties. For example, slide 18 of the TURN Wildfire Scenario results shows that undergrounding has a much lower than average RSE among the SH programs.<sup>25</sup> Similarly, slide 19 shows that, for all scenarios, tree removal had a very low RSE compared to the average for all EVM programs, whereas overhang trimming had a relatively high RSE. These program-by-program results provide interesting and important information. PG&E should be advised to provide RSEs for each of these component programs in its updated GRC analysis.

## 1.2 Improved Granularity of Tranches

As noted in Part I, Section 1.2, PG&E based its analysis on excessively large tranches, including the approximately 7,000 mile HFTD – Distribution To Be Hardened tranche and the approximately 18,000 HFTD – Distribution Remainder tranche. Based on a system hardening risk prioritization analysis that PG&E had performed for its 2020 GRC based on circuit protection zones, TURN asked PG&E to break down these two tranches into 12 tranches, so that, in total, PG&E would have 18 tranches, instead of the 8 used in PG&E's Report. To be clear, TURN is in no way indicating that its breakdown of tranches is either ideal or adequate. The Settlement requires much more granularity than TURN requested, and TURN fully expects that its more granular tranches still mask significant differences in LoRE and CoRE among the assets included in those tranches. In addition, using more up-to-date data to group the more granular tranches would be a good idea.

Still, at the big picture level, the results of TURN's scenarios show that, using more granular RSEs will provide more accurate information for the upcoming GRC.

One lesson is that more granular tranches allow PG&E to more accurately reflect the risk reduction benefits of mitigation work that is expected to be completed before the next GRC period starts in 2023. Slide 6 of the PG&E Results shows that the SH work to be performed prior to 2023 will generally be done in the highest risk tranches until the work is exhausted. TURN's scenarios show that this work will be concentrated in TURN's tranches 2-4. By more accurately showing the risk reduction that will occur from the pre-2023 work, the starting Wildfire Risk scores under TURN's scenarios are lower (roughly 20,000 on Slide 13) than the approximately 25,000 score in PG&E's Report (Slide 12).

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<sup>25</sup> In Scenario TURN-1a, the aggregate SH RSE is 22.1, but the undergrounding mitigation RSE is only 9.0. The same relationship holds true for Scenario TURN-2a.

Another lesson is that TURN's more granular risk analysis better reflects the higher risk reduction that can be obtained when mitigations are focused on the highest risk tranches. For example, as shown on Slide 18, PG&E's SH (M2) aggregated RSE is 7.4, compared to an aggregated SH RSE of 25.4 under Scenario TURN-2a (which uses TURN's preferred MAVF). The difference is because PG&E's analysis incorrectly assumes that the 2100 miles of SH work in 2023-2026 that PG&E is proposing to perform would be spread equally across all 7,000 miles of its "To Be Hardened" tranche, instead of being generally focused in the remaining highest risk tranches captured in TURN's scenario. With tranches that better reflect the homogenous risk profiles required by the Settlement (TURN's tranches 2-9 are artificially grouped to each reflect 10% of the total risk), we can expect to see declining RSEs as the mitigation work moves from higher to lower risk tranches.

And perhaps the most important big picture lesson is that PG&E can carry out an analysis based on more granular tranches than what it performed for the RAMP Report. TURN's tranches should pave the way for a revised Wildfire analysis for the GRC that uses much more granular tranches.

At a more micro level, TURN is not able to indicate at this time whether it agrees with PG&E's specific RSE scores for TURN's scenarios. One question is whether PG&E is overestimating mitigation effectiveness for sub-drivers in each tranche. PG&E's sub-driver effectiveness values appear to be based on allocations of ignitions to each tranche. However, PG&E does not know the locations of ignitions. Hence, PG&E allocates ignitions by sub-driver cause using outage data, for which it has individual circuit protection zone locations. In other words, at the tranche level, PG&E defines risk based on *outages*, not ignitions. The company then uses a calculated fraction of ignitions relative to outages (e.g., 100 balloon-caused outages and 2 balloon-caused ignitions, for a fractional value of 0.02) to allocate ignitions to each tranche. However, if a tranche has zero sub-driver ignitions allocated to it, then PG&E assumes that sub-driver cannot cause an ignition in the future. For example, if an animal has never caused an outage and ignition in a given tranche, PG&E assumes there can never be an animal-caused ignition in the future in that tranche. PG&E has acknowledged that this is a problematic assumption.

In addition, PG&E's computations are not sufficiently documented to provide transparency. For example, PG&E may be revising its CoRE estimates as part of the definitions of the more granular tranches, but that is still unclear to TURN. As with PG&E's Report, we repeatedly have had to ferret out how PG&E has performed its analyses. In each of our conversations, PG&E has revealed additional information about its calculations that should have been readily shared. We recognize that PG&E has been busy with many scenario analyses, but PG&E's leadership needs to ensure that PG&E has the resources to meet the transparency requirements of the Settlement.

Notwithstanding these calculational concerns in the results provided by PG&E, TURN believes that its Wildfire scenarios resoundingly demonstrate the importance of satisfying the Settlement's tranche granularity requirements. PG&E should be advised to work with the parties to develop a much more granular set of tranches for the Wildfire risk to determine RSEs for PG&E's upcoming GRC filing.

## **2. TURN Scenarios to Modify PG&E's MAVF**

TURN requested scenarios to three of the problems with PG&E's MAVF discussed in Part I, Section 3: (i) non-linear scaling functions that lead to tradeoffs which are unrealistic; (ii) a statistical value of life (SVL) that is ten times greater than the accepted value used by federal agencies to assess safety policies; and (iii) an inappropriate cap on PG&E's scaling functions, which mean that adverse consequences beyond a certain point (e.g., 100 fatalities in a wildfire) have no avoidance value.

The specific scenarios were:

- MAVF-TURN-01 reduced the SVL to \$10 million from PG&E's assumed \$100 million. This scenario retained PG&E's nonlinear and capped scaling functions for all attributes. Hence, the only change to the scaling functions is to move the upper bound of the Safety attribute to 1000. The Reliability and Financial attributes were unchanged.
- MAVF-TURN-02 changed the scaling functions to linear for the Safety and Financial Consequences attributes. One benefit of linear scaling is that there is no need to perform any Monte-Carlo analysis, which would simplify PG&E's analysis and improve transparency.<sup>26</sup> The SVL was restored to \$100 million, the value that PG&E originally selected. The caps were removed from the Safety and Financial Consequences scaling functions. The Reliability attribute scaling function was unchanged.

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<sup>26</sup> The MAVF is used to determine the expected scaled value of an attribute when the level  $X$  of the attribute is uncertain. If the scaling function is nonlinear, then the computation to find that expected scaled value can be complicated, depending on the nature of the nonlinearity of the scaling function and the probability distribution of the attribute level  $X$ . But if the scaling function is linear, then the expected scaled value is equal to the scaled value of the expected level of the attribute. Because the expected value of the attribute is an input to any Monte-Carlo simulation, the simulation is no longer necessary: the Monte-Carlo simulation will result in the same expected value that is used to perform it. For example, if the expected number of deaths from a catastrophic wildfire is 16, the range of natural units is between 0 and 100 deaths, and there is a linear scaling function between 0 and 100 scaled units, then the expected value of the scaled units is also 16. If the scaling function is linear between 0 and 1,000 deaths, then the expected value of the scaled units is 1.6. Thus, there is no need to perform a Monte-Carlo analysis to determine the expected value of the scaled units.

- MAVF-TURN-03 changed the scaling functions to linear for the Safety and Financial Consequences attributes, and changed the SVL to \$10 million, the value specified in MAVF-TURN-01. The caps were removed from the Safety and Financial Consequences scaling functions. The Reliability attribute was unchanged. Thus, MAVF-TURN-03 combined the changes in MAVF-TURN-01 and TURN-02. For the reasons given in Part I, Section 3, TURN believes that MAVF-TURN-03 will lead to the best scoring of consequences compared to PG&E's MAVF and the other two TURN scenarios.

The results of these scenarios lead TURN to conclude the following:

- PG&E's caps on the scaling functions underestimate risk. For the Wildfire risk, for example, uncapping the scaling functions (MAVF-TURN-02) increases the total risk score by about 50%.
- PGE's nonlinear scaling functions cause the risk of events with relatively small consequences to be underestimated. PG&E's (and our) analysis shows that, using linear scaling functions increases the estimated risk of relatively small-consequence events by a factor of ten. This is a more accurate reflection of risk, given that an equivalent safety or financial impact (i.e, 1.0 EF or a \$1 million loss) should be given the same value whether it occurs as a result of a risk event with relatively small consequences or one with catastrophic consequences. (See Part I, Section 3.1).
- PGE's choice of SVL = \$100 million causes the Safety consequence scores to be overestimated. Consequently, safety has an exaggerated contribution to total risk. This matters because there must be a tradeoff made between the costs to ratepayers of reducing safety risks and the benefits of those reductions. Using a \$100 million SVL will distort those tradeoffs.

The TURN MAVF scenarios change PG&E's pre-mitigation risk rankings, the post-mitigation risk levels, and the RSE rankings of risks. The differences between TURN's preferred scenario and PG&E's MAVF are significant for some risks and mitigations but in most instances, the differences are less than 25% for total risk scores and RSEs.

PG&E should be advised to present its updated results for the GRC using TURN-MAVF-3 -- or at least present a set of results that reflect this scenario.

### **3. REFCL Scenario**

The REFCL Scenario shows that REFCL is a highly promising technology. Its RSE of 126 far exceeds the RSE for any other Wildfire Risk mitigation. Accordingly, where its deployment makes sense, it has the potential to serve as the primary mitigation. Depending on the results



of PG&E's pilot in March 2021, broad scale deployment could start shortly thereafter, with the main constraint being availability of necessary equipment. In short, REFCL has the potential to have a very significant effect on PG&E's portfolio of mitigations.

PG&E's updated results for the 2023 GRC should include an alternative mitigation plan in which REFCL is deployed as fast as projections of equipment availability allow. This alternative plan should treat REFCL as the primary mitigation for circuits where REFCL is expected to be effective and optimize the use of other mitigations, including covered conductor and vegetation management, as supplemental mitigations. PG&E should be ready to update this analysis during its GRC proceeding. Under no circumstances should risk analysis that takes into account REFCL as a mitigation be deferred to the 2027 GRC.

Dated: November 1, 2020

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## **EXHIBIT B**

### **PG&E'S Response to TURN Data Request 6-1**

**PACIFIC GAS AND ELECTRIC COMPANY**  
**Risk Assessment and Mitigation Phase 2020**  
**Application 20-06-012**  
**Data Response**

PG&E Data Request No.:	TURN 006-Q01-02		
PG&E File Name:	RAMP-2020 DR TURN 006-Q01-02		
Request Date:	November 25, 2020	Requester DR No.:	TURN-PG&E-05
Date Sent:	December 28, 2020	Requesting Party:	The Utility Reform Network
PG&E Sponsor:	Yumi Oum	Requester:	Tom Long

**QUESTION 01**

Please conduct the following alternative scenario analysis, pursuant to Row 30 of the SMAP Settlement adopted in D.18-12-014:

With respect to the first TURN Tranching Scenarios for the wildfire risk, PG&E provided outcomes for four scenarios, which PG&E called TURN\_01a, TURN\_01b, TURN\_02a, TURN\_02b. These scenarios included 13 HFTD-distribution tranches. For the system hardening program, which was deployed in the order of tranches, mitigations for 2023-2026 were only deployed to tranches 5-9 (and partially to tranche 4 for undergrounding), presumably because PG&E's proposal does not include more mileage or time to accomplish further tranches for the system hardening proposal.

In this request, TURN requests that the TURN Tranching Scenarios be re-run to calculate all outputs (e.g. risk reduction, cost, RSE, etc.) for all System Hardening mitigations applied to *all tranches to which the mitigation was not already applied prior to the 2023- 2026 rate case period*. For purposes of this scenario, PG&E should assume that the SH mitigations are applied to all miles in tranches 5-13, with the work assumed to be completed for tranches 5-11 in 2023-2025 and the remaining tranches in 2026. The results of this assumption will enable a calculation of RSE per mile for each of tranches 5-13. Please conduct this scenario: (1) using PG&E's MAVF and (2) using the MAVF in MAVF\_TURN\_03.

Please contact us with any clarifications or questions regarding this request.

**ANSWER 01**

PG&E ran two scenarios as requested and provided assumptions and results to the attached Excel workbook RAMP-2020\_DR\_TURN\_006-Q01-02Atch01.xlsx. Scenario WF-TURN-01c is the results with PG&E's MAVF and WF-TURN-02c is with MAVF in MAVF\_TURN\_03.

In the process of running these two scenarios, PG&E updated the previous scenario analysis shared for TURN\_01a, TURN\_01b, TURN\_02a, and TURN\_02b to use the same assumptions other than the differences among the scenarios a, b and c.

Scenarios a, b and c differ by the assumed program exposure for system hardening and enhanced vegetation management program. The detailed assumptions are shown in the "Program Exposure and Unit Cost" sheet. RSE results are provided for tranche 5-13 in "SH RSE" sheet.

## **Question 02**

With respect to the TURN Tranching Scenario Analysis results document dated 10/22/20 (p. 2 of the PDF), please provide in Excel the unit cost assumed for each of the six System Hardening (SH) and four Enhanced Vegetation Management (EVM) mitigations, separately. Please include all supporting assumptions, workpapers, and calculations in Excel.

## **ANSWER 02**

PG&E does not track unit cost at a disaggregated level for the components of System Hardening (SH) and Enhanced Vegetation Management (EVM) mitigations. For the purposes of scenario analysis, assumptions were based on SME judgement and only apply to these scenario analyses.

Please see "Cost" sheet of the attached Excel workbook RAMP-2020\_DR\_TURN\_006-Q01-02Atch01.xlsx for those assumptions.